First trimester prediction of pre-eclampsia in high-risk women using 3D power Doppler placental vascularisation indices.

Eastwood, K-A., Patterson, C., Hunter, A., McCance, D., Young, I., & Holmes, V. (2017). First trimester prediction of pre-eclampsia in high-risk women using 3D power Doppler placental vascularisation indices. *Ultrasound in Obstetrics and Gynecology*, *50*(S1), 222-222. [P21.04]. https://doi.org/10.1002/uog.18211

Published in:
Ultrasound in Obstetrics and Gynecology

Document Version:
Peer reviewed version

Queen's University Belfast - Research Portal:
Link to publication record in Queen's University Belfast Research Portal

First trimester prediction of pre-eclampsia in high risk women using 3D power Doppler placental vascularisation indices

Introduction: 3D Power Doppler (3DPD) imaging of the placenta enables evaluation of Placental Vascularisation Indices (PVIs). The aim of this study was to examine the ability of Vascularisation Index (VI, %), Flow Index (FI) and Vascularisation Flow Index (VFI) to predict pre-eclampsia (PET) in four groups of high risk women: (1) diabetes (type 1 and 2) (2) booking Body Mass Index (BMI) >35kg/m^2 (3) hypertension, renal disease, intrauterine growth restriction (4) thrombophilia, autoimmune disease.

Methods: Analysis was performed among women (n=194) recruited to the PREDICT study (prediction of PET in high-risk women). Women were recruited between 11+0 and 13+6 weeks gestation from a tertiary referral centre in Northern Ireland. PVIs were derived from 3DPD whole placental volume scanning via Virtual Organ Computer-aided Analysis (VOCAL) technique. Logistic regression models using PET as the outcome were determined for each PVI. Covariates included: study group, age, BMI, smoking status, aspirin use, parity, material deprivation of area of residence and Mean Arterial Pressure (MAP).

Results: The overall rate of PET was 12%. No significant differences in age, smoking status, deprivation or MAP were seen between groups. Significant differences in parity (P=0.002), BMI (P<0.001) and aspirin use (P<0.001) were noted. In the logistic regression model, a 1% increase in VI from a mean of 14.2 (SD 7.7) to 15.2% was associated with a 10% reduction in the odds of PET (OR 0.90, 95% CI 0.82-0.98, P=0.02) and a 1 unit increase in FI (mean 42.1, SD 10.3) was associated with a 6% reduction in the odds of PET (OR 0.94, 95% CI 0.89-1.0, P=0.04). A doubling in VFI (median 5.1, IQR 3.4-8.3) was associated with a 57% reduction in the odds of PET (OR 0.43, 95% CI 0.26-0.70, P=0.001).

Conclusions: Using logistic regression, VI, FI and VFI were predictive of PET in separate models controlling for confounding variables. This technique may be a useful adjunct for clinicians wishing to refine first trimester screening models to predict PET.